



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Jonathan J. Wierer Jr., Michael R. Krames, Mihail M. Sigalas
Assignee: Lumileds Lighting U.S., LLC
Title: Photonic Crystal Light Emitting Device
Serial No.: 10/691,026 Filing Date: October 21, 2003
Examiner: Sara W. Crane Group Art Unit: 2811
Docket No.: LUM-03-03-02

San Jose, California
February 1, 2005

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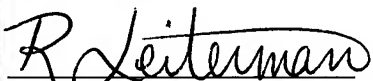
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Pursuant to 37 C.F.R. § 1.56, § 1.97 and § 1.98, the documents listed on the accompanying forms PTO/SB/08A and PTO/SB/08B are called to the attention of the Examiner for the above patent application. Copies of the cited article, patent applications, and foreign patent documents are enclosed. Copies of the cited US Patent documents are not enclosed as the requirement under 37 CFR 1.98 (a)(2)(i) is waived.

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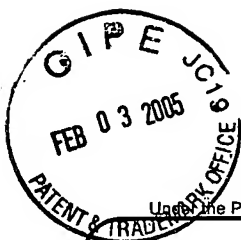

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Respectfully submitted,



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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

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Sheet 1 of 3

Complete if Known

Application Number	10/691,026
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Examiner Name	Sara W. Crane
Attorney Docket Number	LUM-03-03-02

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US- 5,779,924	7-14-1998	Krames et al.	
		US- 2004/0016936 A1	1-29-2004	Tanaka et al.	
		US- 2003/0141507 A1	7-31-2003	Krames et al.	
		US- 6,307,218 B1	10-23-01	Steigerwald et al.	
		US- 6,363,096	3-26-2002	Dodabalapur et al.	
		US- 6,335,548	1-1-2002	Roberts et al.	
		US- 6,156,581	12-5-2000	Vaudo et al.	
		US- 6,071,795	6-6-2000	Cheung et al.	
		US- 6,559,075 B1	5-6-2003	Kelly et al.	
		US- 2003/0222263 A1	12-4-2003	Choi	
		US- 5,955,749	9-21-1999	Joannopoulos et al.	
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FOREIGN PATENT DOCUMENTS

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		Country Code ³ *Number ⁴ *Kind Code ⁵ (if known)				
		JP 07176788	7-1995	Kurahashi		
		EP 1 385 215 A2	1-28-2004	Nichia Corp.		

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Sheet 2 of 3	Attorney Docket Number	LUM-03-03-02	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		J.J. WIERER et al., "InGaN/GaN quantum-well heterostructure light-emitting diodes employing photonic crystal structures," Applied Physics Letters, Vol. 84, No. 19, May 10, 2004, pp. 3885-3887.	
		LEE et al., "Modified spontaneous emission from a two-dimensional photonic bandgap crystal slab," J. Opt. Soc. Am. B, Vol. 17, No. 8, August 2000, pp. 1438-1442.	
		BORODITSKY et al., "Surface recombination measurements on III-V candidate materials for nanostructure light-emitting diodes," Journal of Applied Physics, Vol. 87, No. 7, April 1, 2000, pp. 3497-3504.	
		BORODITSKY et al., "Light extraction from optically pumped light-emitting diode by thin-slab photonic crystals," Applied Physics Letters, Vol. 75, No. 8, August 23, 1999, pp. 1036-1038.	
		WINDISCH et al., "Light-emitting diodes with 31% external quantum efficiency by outcoupling of lateral waveguide modes," Applied Physics Letters, Vol. 74, NO. 16, April 19, 1999, pp. 2256-2258.	
		XU et al., "Finite-difference time-domain calculation of spontaneous emission lifetime in a microcavity," J. Opt. Soc. Am. B, Vol. 16, No. 3, March, 1999, pp. 465-474.	
		HWANG et al., "Spontaneous emission rate of an electric dipole in a general microcavity," Physical Review B, Vol. 60, No. 7, August 15, 1999, pp. 4688-4695.	
		FAN et al., "High Extraction Efficiency of Spontaneous Emission from Slabs of Photonic Crystals," Physical Review Letters, Vol. 78, No. 17, April 28, 1997, pp. 3294-3297.	
		Vuckovic et al., "Surface Plasmon Enhanced Light Emitting Diode," Journal of Quantum Electronics, Vol. 36, 2000, pp. 1-13.	
		Tredicucci et al., "Single-mode surface-plasmon laser," Applied Physics Letters, Vol. 76, No. 16, April 17, 2000, pp. 2164-2166.	

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		Imada et al., "Coherent two-dimensional lasing action in surface-emitting laser with triangular-lattice photonic crystal structure," Applied Physics Letters, Vol. 75, No. 3, July 19, 1999, pp. 316-318.	
		Pottage et al., " Vertical-cavity surface-emitting resonances in photonic crystal films," J. Opt. Soc. Am. A, Vol. 18, No. 2, February 2001, pp. 442-447.	
		TIWARI, S., "Compound Semiconductor Device Physics," Academic Press, Inc., San Diego, CA, 1992, pp. 182-186.	
		G.B. STRINGFELLOW and M. GEORGE CRAWFORD, eds., "High Brightness Light Emitting Diodes," Academic Press, Inc., 1997, Chapter5, "AlGaInP Light-Emitting Diodes," by F.A. KISH and R.M. FLETCHER, pp. 149-170.	
		P.A. KOHL, "Photoelectrochemical etching of semiconductors", IBM J. Res. Develop., Vol. 42, No. 5, 5 September 1998, pp. 629-637.	
		Chen-Fu CHU et al., "Comparison of p-Side Down and p-Side Up GaN Light-Emitting Diodes Fabricated by Laser Lift-Off", Jpn. J. Appl. Phys., Vol. 42 (2003), Part 2, NO. 2B, 15 February 2003, pp. L147-L150.	
		W.S. WONG et al., " InxGa1-xN light emitting diodes on Si substrates fabricated by Pd-In metal bonding and laser lift-off", Applied Physics Letters, Vol. 77, No. 18, 30 October 2000, pp. 2822-2824.	
		H. BENISTY et al., "Impact of Planar Microcavity Effects on Light Extraction - Part I: Basic Concepts and Analytical Trends", IEEE Journal of Quantum Electronics, Vol. 34, No. 9, September 1998, pp. 1612-1631.	
		T. FUJII et al., "Increase in the extraction efficiency of GaN-based light-emitting diodes via surface roughening", Applied Physics Letters, Vol. 84, No. 6, 9 February 2004, pp. 855-857.	
		Y.-K. SONG et al., "Resonant-cavity InGaIn quantum-well blue light-emitting diodes", Applied Physics Letters, Vol. 77, No. 12, 18 September 2000, pp. 1744-1746.	

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